G03F

COOPERATIVE PATENT CLASSIFICATION

G PHYSICS

INSTRUMENTS

G03 PHOTOGRAPHY; CINEMATOGRAPHY; ANALOGOUS TECHNIQUES USING WAVES OTHER THAN OPTICAL WAVES; ELECTROGRAPHY; HOLOGRAPHY

G03F PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, e.g. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES; MATERIALS THEREFOR; ORIGINALS THEREFOR; APPARATUS SPECIALLY ADAPTED THEREFOR; (phototypographic composing devices B41B; photosensitive materials or processes for photographic purposes G03C; electrophotography, sensitive layers or processes therefor G03G)

NOTE

In this subclass, the following terms or expressions are used with the meanings indicated:

- "photosensitive" means not only sensitive to electromagnetic radiation but also to corpuscular radiation;
- "photosensitive compositions" covers photosensitive substances, e.g. quinonediazides, and, if applicable, binders or additives;
- "photosensitive materials" covers the photosensitive compositions, e.g. photoresists, the bases carrying them and, if applicable, auxiliary layers.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

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2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Originals for photomechanical production of textured or patterned surfaces, e.g., masks, photomasks, reticles; Mask blanks or pellicles therefor; Containers specially adapted therefor; Preparation thereof

NOTE

In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

1/20 . Masks or mask blanks for imaging by charged particle beam [CPB] radiation, e.g. by electron beam; Preparation thereof

1/22 . Masks or mask blanks for imaging by radiation of 100 nm or shorter wavelength, e.g. X-ray masks, extreme ultra-violet [EUV] masks; Preparation thereof

1/24 . Reflection masks; Preparation thereof

1/26 . Phase shift masks [PSM]; PSM blanks; Preparation thereof

1/28 . with three or more diverse phases on the same PSM; Preparation thereof

1/29 . Rim PSM or outrigger PSM; Preparation thereof

1/30 . Alternating PSM, e.g. Levenson-Shibuya PSM; Preparation thereof

1/32 . Attenuating PSM [att-PSM], e.g. halftone PSM or PSM having semi-transparent phase shift portion.; Preparation thereof

1/34 . Phase-edge PSM, e.g. chromeless PSM; Preparation thereof

1/36 . Masks having proximity correction features; Preparation thereof, e.g. optical proximity correction [OPC] design processes

1/38 . Masks having auxiliary features, e.g. special coatings or marks for alignment or testing;

1/40 . Electrostatic discharge [ESD] related features, e.g. antistatic coatings or a conductive metal layer around the periphery of the mask substrate

1/42 . Alignment or registration features, e.g. alignment marks on the mask substrates

1/44 . Testing or measuring features, e.g. grid patterns, focus monitors, sawtooth scales or notched scales

1/46 . Antireflective coatings

1/48 . Protective coatings
Organic absorbers, e.g. of photo-resists

having two or more different absorber layers, e.g. stacked multilayer absorbers

Adapting basic layout or design of masks to lithographic process requirements, e.g., second iteration correction of mask patterns for imaging

Repair or correction of mask defects by charged particle beam [CPB], e.g. focused ion beam

Patterning of masks by imaging by charged particle beam [CPB], e.g. electron beam patterning of masks

Etching

Auxiliary processes, e.g. cleaning or inspecting

Inspecting by charged particle beam [CPB]

prepared by photographic processes for production of originals simulating relief

prepared by montage processes

prepared from printing surfaces

Colour separation; Correction of tonal value (photographic copying apparatus in general G03B)

by retouching

by photographic means

by masking

Checking the colour or tonal value of separation negatives or positives

by means other than using non-impact printing methods or duplicating or marking methods covered by B41M 5/00

Lamination or delamination method or apparatus for colour proofing systems

using tonable photoresist or photopolymerisable systems

using electro photographic materials

using non-macromolecular photopolymerisable compounds having carbon-to-carbon double bonds, other than silicon containing compounds

using silver halide photosensitive materials

using a non-impact printing method, e.g. ink jet, using duplicating or marking methods covered by B41M 5/00, e.g. by ablation or by thermographic means

Screening processes; Screens therefor [(plates or light sensitive layers with incorporated screen G03F 7/004)]

by projection methods (cameras G03B)

changing the screen effect

changing the diaphragm effect

using line screens

using cross-line screens

using other screens, e.g. granulated screen

by contact methods

using grey half-tone screens

using colour half-tone screens

using screens for gravure printing

combining several screens; Elimination of moiré

by multiple exposure, e.g. combined processes for line photo and screen
7/0044 . . . [involving an interaction between the metallic and non-metallic component, e.g. photodep systems]
7/0045 . . . [with organic non-macromolecular light-sensitive compounds not otherwise provided for, e.g. dissolution inhibitors]
7/0046 . . . [with perfluro compounds, e.g. for dry lithography (G03F 7/0048 takes precedence)]
7/0047 . . . [characterised by additives for obtaining a metallic or ceramic pattern, e.g. by firing]
7/0048 . . . [characterised by the solvents or agents facilitating spreading, e.g. tensio-active agents]
7/008 . . . Azides (G03F 7/075 takes precedence)
7/0085 . . . [characterised by the non-macromolecular additives]
7/012 . . . Macromolecular azides; Macromolecular additives, e.g. binders (G03F 7/0085 takes precedence)
7/0125 . . . [characterised by the polymeric binder or the macromolecular additives other than the macromolecular azides]
7/016 . . . Diazonium salts or compounds (G03F 7/075 takes precedence)
7/0163 . . . [Non ionic diazonium compounds, e.g. diazosulphonates; Precursors thereof, e.g. triazenes]
7/0166 . . . [characterised by the non-macromolecular additives]
7/021 . . . Macromolecular diazonium compounds; Macromolecular additives, e.g. binders (G03F 7/0166 takes precedence)
7/0212 . . . [characterised by the polymeric binder or the macromolecular additives other than the diazo resins or the polymeric diazonium compounds]
7/0215 . . . [Natural gums; Proteins, e.g. gelatins; Macromolecular carbohydrates, e.g. cellulose; Polivinyl alcohol and derivatives thereof, e.g. polyvinylacetals]
7/0217 . . . [Polyurethanes; Epoxy resins]
7/022 . . . Quinonediazides (G03F 7/075 takes precedence)
7/0223 . . . [Iminoquinonediazides; Para-quinonediazides]
7/0226 . . . [characterised by the non-macromolecular additives]
7/023 . . . Macromolecular quinonediazides; Macromolecular additives, e.g. binders (G03F 7/0226 takes precedence)
7/0233 . . . [characterised by the polymeric binders or the macromolecular additives other than the macromolecular quinonediazides]
7/0236 . . . [Condensation products of carbonyl compounds and phenolic compounds, e.g. novolak resins]
7/025 . . . Non-macromolecular photopolymerisable compounds having carbon-to-carbon triple bonds, e.g. acetylenic compounds (G03F 7/075 takes precedence)
7/027 . . . Non-macromolecular photopolymerisable compounds having carbon-to-carbon double bonds, e.g. ethylenic compounds (G03F 7/075 takes precedence)
7/0275 . . . [with dithiol or polysulfide compounds]
7/028 . . . with photosensitivity-increasing substances, e.g. photoinitiators
7/0285 . . . [Silver salts, e.g. a latent silver salt image]
7/029 . . . Inorganic compounds; Onium compounds; Organic compounds having hetero atoms other than oxygen, nitrogen or sulfur
7/0295 . . . [Photolytic halogen compounds]
7/031 . . . Organic compounds not covered by group G03F 7/029
7/032 . . . with binders
7/0325 . . . [the binders being polysaccharides, e.g. cellulose]
7/033 . . . the binders being polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds, e.g. vinyl polymers
7/035 . . . the binders being polyurethanes
7/037 . . . the binders being polyamides or polyimides
7/038 . . . Macromolecular compounds which are rendered insoluble or differentially wettable (G03F 7/075 takes precedence; macromolecular azides G03F 7/012; macromolecular diazonium compounds G03F 7/021)
7/0381 . . . [using a combination of a phenolic resin and a polyoxyethylene resin]
7/0382 . . . [the macromolecular compound being present in a chemically amplified negative photoresist composition]
7/0384 . . . [with ethylenic or acetylenic bands in the main chain of the photopolymer]
7/0385 . . . [using epoxidised novolak resin]
7/0387 . . . [Polyamides or polyimides]
7/0388 . . . [with ethylenic or acetylenic bands in the side chains of the photopolymer]
7/039 . . . Macromolecular compounds which are photodegradable, e.g. positive electron resists (G03F 7/075 takes precedence; macromolecular quinonediazides G03F 7/022)
7/0392 . . . [the macromolecular compound being present in a chemically amplified positive photoresist composition]
7/0395 . . . [the macromolecular compound having a backbone with alicyclic moieties]
7/0397 . . . [the macromolecular compound having an alicyclic moiety in a side chain]
7/04 . . . Chromates (G03F 7/075 takes precedence)
7/06 . . . Silver salts (G03F 7/075 takes precedence)
7/063 . . . [Additives or means to improve the lithographic properties; Processing solutions characterised by such additives; Treatment after development or transfer, e.g. finishing, washing; Correction or deletion fluids]
7/066 . . . [Organic derivatives of bivalent sulfur, e.g. onium derivatives]
7/07 . . . used for diffusion transfer (G03F 7/063 takes precedence)
7/075 . . . Silicon-containing compounds
7/0751 . . . [used as adhesion-promoting additives or as means to improve adhesion]
7/0752 . . . [in non photosensitive layers or as additives, e.g. for dry lithography]
7/0754 . . . [Non-macromolecular compounds containing silicon-to-silicon bonds (G03F 7/0752 takes precedence)]
7/0755 . . . [Non-macromolecular compounds containing Si-O, Si-C or Si-N bonds (G03F 7/0752 takes precedence)]
7/0757 . . . [Macromolecular compounds containing Si-
O, Si-C or Si-N bonds (G03F 7/0752 takes
precedence)]

7/0758 . . . [with silicon- containing groups in the side
chains]

7/085 . . . Photosensitive compositions characterised
by adhesion-promoting non-macromolecular
additives (G03F 7/0725 takes precedence)

7/09 . . . characterised by structural details, e.g. supports,
auxiliary layers (supports for printing plates in
general B41N)

7/091 . . . [characterised by antireflection means or light
filtering or absorbing means, e.g. anti-halation,
contrast enhancement]

7/092 . . . [characterised by backside coating or layers,
by lubricating-slip layers or means, by oxygen
barrier layers or by stripping-release layers or means]

7/093 . . . [characterised by antistatic means, e.g. for
decharge depletion]

7/094 . . . [Multilayer resist systems, e.g. planarising
layers]

7/095 . . . having more than one photosensitive layer
(G03F 7/075 takes precedence)

7/0952 . . . [comprising silver halide or silver salt based
image forming systems, e.g. for camera
speed exposure]

7/0955 . . . [one of the photosensitive systems
comprising a non-macromolecular
photopolymerisable compound having
carbon-to-carbon double bonds, e.g.
ethylenic compounds]

7/0957 . . . [with sensitive layers on both sides of the
substrate]

7/105 . . . having substances, e.g. indicators, for forming
visible images

7/11 . . . having cover layers or intermediate layers, e.g.
subbing layers (G03F 7/091 - G03F 7/093,
B41N 3/03 take precedence)

7/115 . . . having supports or layers with means for
obtaining a screen effect or for obtaining better
contact in vacuum printing

7/12 . . . Production of screen printing forms or similar
printing forms, e.g. stencils

7/14 . . . Production of colotype printing forms

7/16 . . . Coating processes; Apparatus therefor (applying
coatings to base materials in general B05;
applying photosensitive compositions to base for
photographic purposes G03C 1/74)

7/161 . . . [using a previously coated surface, e.g. by
stamping or by transfer lamination]

7/162 . . . [Coating on a rotating support, e.g. using a
whirler or a spinner]

7/164 . . . [using electric, electrostatic or magnetic means;
powder coating]

7/165 . . . [Monolayers, e.g. Langmuir-Blodgett]

7/167 . . . [from the gas phase, by plasma deposition
(G03F 7/2035 takes precedence)]

7/168 . . . [Finishing the coated layer, e.g. drying, baking,
soaking]

7/18 . . . Coating curved surfaces

7/20 . . . Exposure; Apparatus therefor (photographic
printing apparatus for making copies G03B 27/00)

7/2002 . . . [with visible light or UV light, through an
original having an opaque pattern on a transparent
support, e.g. film printing, projection printing; by
reflection of visible or UV light from an original
such as a printed image]

7/2004 . . . [characterised by the use of a particular light
source, e.g. fluorescent lamps or deep UV
light]

7/2006 . . . [using coherent light; using polarised light]

7/2008 . . . [characterised by the reflectors, diffusers, light
or heat filtering means or anti-reflective means
used]

7/201 . . . [characterised by an oblique exposure;
characterised by the use of plural sources;
characterised by the rotation of the optical
device; characterised by a relative movement of
the optical device, the light source, the sensitive
system or the mask]

7/2012 . . . [using liquid photohardening compositions,
e.g. for the production of reliefs such as
flexographic plates or stamps]

7/2014 . . . [Contact or film exposure of light sensitive
plates such as lithographic plates or circuit
boards, e.g. in a vacuum frame]

7/2016 . . . [Contact mask being integral part of the
photosensitive element and subject to
destructive removal during post-exposure
processing]

7/2018 . . . [Masking pattern obtained by selective
application of an ink or a toner, e.g. ink jet
printing]

7/202 . . . [Masking pattern being obtained by
thermal means, e.g. laser ablation]

7/2022 . . . [Multi-step exposure, e.g. hybrid; backside
exposure; blanket exposure, e.g. for image
reversal; edge exposure, e.g. for edge bead
removal; corrective exposure]

7/2024 . . . [of the already developed image]

7/2026 . . . [for the removal of unwanted material, e.g.
image or background correction]

7/2028 . . . [of an edge bead on wafers]

7/203 . . . [comprising an imagewise exposure to
electromagnetic radiation or corpuscular
radiation]

7/2032 . . . [Simultaneous exposure of the front side and
the backside]

7/2035 . . . [simultaneous coating and exposure; using a belt
mask; e.g. endless]

7/2037 . . . [Exposure with X-ray radiation or corpuscular
radiation, through a mask with a pattern opaque to
that radiation]

7/2039 . . . [X-ray radiation]

7/2041 . . . [in the presence of a fluid, e.g. immersion; using
fluid cooling means]

7/2043 . . . [with the production of a chemical active
agent from a fluid, e.g. an etching agent; with
material deposition from the fluid phase, e.g.
contamination resists]

7/2045 . . . [using originals with apertures, e.g. stencil
exposure masks]

7/2047 . . . [Exposure with radiation other than visible
light or UV light, e.g. shadow printing,
proximity printing]

7/2049 . . . [using a cantilever]
Imagewise removal using liquid means (G03F 7/34 takes precedence)

Imagewise removal using biological means only, e.g. enzymes (G03F 7/422)

Imagewise removal using ultrasonic means only (G03F 7/428)

Imagewise removal using plasma and radiation, e.g. plasma and radiation, is classified in group G03F 7/42 only (G03F 7/70)

Imagewise removal using pulsed sources (G03F 7/428)

Imagewise removal using discharge lamps (discharge lamps per se H01J 61/00) (G03F 7/70)

Imagewise removal using lasers (lasers per se H01S 3/00) (G03F 7/70)

Imagewise removal using plasma EUV sources (plasma EUV sources per se H05G 2/00) (G03F 7/70)

Imagewise removal using pulsed sources (G03F 7/70)

Imagewise removal using multiple sources (addressable array sources specially adapted to produce patterns G03F 7/70/01) (G03F 7/70)

Imagewise removal using mask illumination systems (G03F 7/70)

Imagewise removal using size and form of the illuminated area in the mask plane, e.g. REMA (G03F 7/70)

Imagewise removal using homogenization of illumination intensity in the mask plane, by using an integrator, e.g. fly's eye lenses, facet mirrors, glass rods, by using a diffusive optical element or by beam deflection (G03F 7/70)

Imagewise removal using non-homogeneous intensity distribution in the mask plane (G03F 7/70)

Imagewise removal not covered by groups G03F 7/30 - G03F 7/34, e.g. using gas streams, using plasma, using plasma means only, e.g. plasma and radiation, is classified in group G03F 7/42 only (G03F 7/36)

Imagewise removal not covered by groups G03F 7/30 - G03F 7/34, e.g. using gas streams, using plasma, using plasma means only, e.g. plasma and radiation, is classified in group G03F 7/42 only (G03F 7/36)

Imagewise removal not covered by groups G03F 7/30 - G03F 7/34, e.g. using gas streams, using plasma, using plasma means only, e.g. plasma and radiation, is classified in group G03F 7/42 only (G03F 7/36)

Imagewise removal not covered by groups G03F 7/30 - G03F 7/34, e.g. using gas streams, using plasma, using plasma means only, e.g. plasma and radiation, is classified in group G03F 7/42 only (G03F 7/36)
G03F

7/70091 . . . [Illumination settings, i.e. intensity distribution in the pupil plane, angular distribution in the field plane; On-axis or off-axis settings, e.g. annular, dipole, quadrupole; Partial coherence control, i.e. sigma or numerical aperture [NA]]

7/701 . . . (Off-axis setting using an aperture)

7/70108 . . . (Off-axis setting using a light-guiding element)

7/70116 . . . (Off-axis setting using a programmable means, e.g. LCD or DMD)

7/70125 . . . [Use of illumination settings tailored to particular mask patterns (details of setting means G03F 7/70091)]

7/70133 . . . [Measurement of illumination distribution, in pupil plane or field plane]

7/70141 . . . [Illumination system adjustment, alignment during assembly of illumination system (alignment of mask with workpiece G03F 9/70)]

7/7015 . . . [Details of optical elements]

7/70158 . . . [Diffractive optical elements]

7/70166 . . . [Capillary or channel elements, e.g. nested EUV mirrors]

7/70175 . . . [Lamphouse reflector arrangements, i.e. collecting light from solid angle upstream of the light source]

7/70183 . . . [Zoom systems]

7/70191 . . . [Optical correction elements, filters or phase plates for controlling intensity, wavelength, polarization, phase or the like]

NOTE

Wavelength or polarisation control is further classified in groups G03F 7/70566, G03F 7/70575

7/702 . . . [Reflective illumination, i.e. reflective optical elements other than folding mirrors]

7/70208 . . . [Multiple illumination paths, e.g. radiation distribution device, multiplexer, demultiplexer for single or multiple projection systems]

7/70216 . . . [Systems for imaging mask onto workpiece]

7/70225 . . . [Catadioptric systems, i.e. documents describing optical design aspect details]

NOTE

Catadioptric systems are further classified in group G02B 17/0892

7/70233 . . . [Optical aspects of catadioptric systems]

NOTE

Further aspects of catadioptric systems are classified in group G02B 17/06

7/70241 . . . [Optical aspects of refractive systems]

NOTE

Further aspects of refractive systems are classified in group G02B 13/143

7/7025 . . . [Size or form of projection system aperture]

7/70258 . . . [Projection system adjustment, alignment during assembly of projection system (alignment of mask with workpiece G03F 9/70)]

7/70266 . . . [Adaptive optics, e.g. deformable optical elements for wavefront control]

7/70275 . . . [Multiple projection paths, array of projection systems, microlens projection systems, tandem projection systems]

7/70283 . . . [ Masks or their effects on the imaging process, e.g. Fourier masks, greyscale masks, holographic masks, phase shift masks, phasemasks, lenticular masks, multiple masks, tilted masks, tandem masks (masks per se G03F 1/00)]

7/70291 . . . [Addressable masks]

7/703 . . . [Non-planar pattern area or non-planar masks]

7/70308 . . . [Optical correction elements, filters and phase plates for manipulating, e.g. intensity, wavelength, polarization, phase, image shift (filters per se G02B 5/20)]

NOTE

Wavelength or polarisation control is further classified in groups G03F 7/70566, G03F 7/70575

7/70316 . . . [Details of optical elements, e.g. of Bragg reflectors or diffractive optical elements]

NOTES

1. Particular optical materials are further classified in group G03F 7/70958;

2. Multilayer reflectors for X-ray or EUV lithography are further classified in group G21K 1/062

7/70325 . . . [Resolution enhancement techniques not otherwise provided for, e.g. darkfield imaging, interfering beams, spatial frequency multiplication, nearfield lens]

7/70333 . . . [Focus drilling, e.g. FLEX]

7/70341 . . . [Immersion (chemical composition of immersion liquids G03F 7/2041)]

7/7035 . . . [Proximity or contact printer]

7/70358 . . . [Scanning exposure, i.e. relative movement of patterned beam and workpiece during imaging]

7/70366 . . . [Rotary scanning]

7/70375 . . . [Imaging systems not otherwise provided for, e.g. multiphoton lithography; Imaging systems comprising means for converting one type of radiation into another type of radiation, systems comprising mask with photo-cathode]

7/70383 . . . [Direct write, i.e. pattern is written directly without the use of a mask by one or multiple beams ("maskless" lithography using a programmable mask G03F 7/70291)]

7/70391 . . . [Addressable array sources specially adapted to produce patterns, e.g. addressable LED arrays (array sources for exposure apparatus comprising a mask G03F 7/7005; illumination setting using programmable means in exposure apparatus comprising a mask G03F 7/70116)]

7/704 . . . [Scanned exposure beam, e.g. raster-, rotatory- and vector scanning (mask projection exposure involving relative movement of patterned beam and workpiece during imaging G03F 7/70358)]
NOTE

Apparatus for photolithographical production of three dimensional images are further classified in group G03F 7/0037 and group B29C 64/00

7/70425 . . . [Imaging strategies, e.g. for increasing throughput, printing product fields larger than the image field, compensating lithography- or non-lithography errors, e.g. proximity correction, mix-and-match, stitching, double patterning]

7/70433 . . . [Layout for increasing efficiency, for compensating imaging errors, e.g. layout of exposure fields; Use of mask features for increasing efficiency, for compensating imaging errors (circuit design per se G03F 30/30; designing or making of mask G03F 1/00)]

7/70441 . . . [Optical proximity correction]

7/7045 . . . [Hybrid exposure, i.e. combining different types of exposure, e.g. projection, proximity, direct write, interferometric, uv, x-ray, particle beam (constructional details G03F 7/70991)]

7/70458 . . . [Mix-and-match, i.e. multiple exposures of the same area using similar types of exposure, e.g. UV exposure]

7/70466 . . . [Multiple exposures, e.g. combination of fine and coarse exposures, double patterning, multiple exposures for printing a single feature, mix-and-match (stitching G03F 7/70475)]

7/70475 . . . [Stitching, i.e. connecting image fields to produce a device field, the field occupied by a device such as a memory chip, processor chip, CCD, flat panel display]

7/70483 . . . [Information management, control, testing, and wafer monitoring, e.g. pattern monitoring (detection arrangements G03F 7/7085)]

7/70491 . . . [Information management and control, including software]

7/705 . . . . [Modelling and simulation from physical phenomena up to complete wafer process or whole workflow in wafer fabrication]

7/70508 . . . [Data handling, in all parts of the microlithographic apparatus, e.g. addressable masks]

7/70516 . . . [Calibration of components of the microlithographic apparatus, e.g. light sources, addressable mask, detectors]

7/70525 . . . [Controlling normal operating mode, e.g. matching different apparatus, remote control, prediction of failure]

7/70533 . . . [Controlling abnormal operating mode, e.g. taking account of waiting time, decision to rework, rework flow]

7/70541 . . . [Tagging, i.e. hardware or software tagging of features or components]

7/7055 . . . [Exposure light control, in all parts of the microlithographic apparatus, e.g. pulse length control, light interruption]

7/70558 . . . [Dose control, i.e. achievement of a desired dose (determination of the required dose G03F 7/70625)]

7/70566 . . . [Polarisation control]

7/70575 . . . [Wavelength control, e.g. control of bandwidth, multiple wavelength, selection of wavelength, matching of optical components to wavelength]

7/70583 . . . [Speckle reduction, e.g. coherence control, amplitude/wavefront splitting]

7/70591 . . . [Testing optical components (testing of optical mirrors G01M 11/005; testing of lenses G01M 11/02; stray light transmission G03F 7/70941)]

7/706 . . . . [Aberration measurement (aberration measurement in general G01M 11/0242)]

7/70608 . . . [Wafer resist monitoring, e.g. measuring thickness, reflectivity, effects of immersion liquid on resist]

7/70616 . . . [Wafer pattern monitoring, i.e. measuring printed patterns or the aerial image at the wafer plane (optical metrology tools per se G01B 11/02 and G01B 9/04)]

7/70625 . . . [Pattern dimensions, e.g. line width, profile, sidewall angle, edge roughness]

7/70633 . . . [Overlay (alignment between mask and wafer prior to exposure G03F 9/70)]

7/70641 . . . [Focus (focus measurement prior to exposure G03F 9/7026)]

7/7065 . . . . [Defect inspection (defect inspection apparatus per se G06T 7/0004, G01N 21/056)]

7/70658 . . . [Electrical]

7/70666 . . . [Using aerial image (aerial image measurement tools for mask inspection G03F 1/68)]

7/70675 . . . [Using latent image]

7/70683 . . . [Using process control mark, i.e. specific mark designs]

7/70691 . . . [Handling of masks or wafers]

7/707 . . . . [Chucks, e.g. chucking or un-chucking operations (chucks for workpiece processing tools H01L 21/683 or H01L 21/687 depending on the type of chucking)]

7/70708 . . . [being electrostatic; Electrostatically deformable vacuum chucks (electrostatic chucks for workpiece processing tools H01L 21/683)]

7/70716 . . . [Stages (stages for workpiece processing tools H01L 21/682)]

7/70725 . . . [control]

7/70733 . . . [Handling masks and workpieces, e.g. exchange of workpiece or mask, transport of wafer for part of tool]

7/70741 . . . [Handling masks outside exposure position, e.g. reticle libraries]

NOTE

Protective means, e.g. containers, for masks, blanks or pellicles, are further classified in group G03F 1/66

7/7075 . . . . [Handling workpieces outside exposure position, e.g. SMIF box]
7/70758 . . . [Drive means, e.g. actuator, motor (lens or mirror actuators G03F 7/70825)]
7/70766 . . . [Reaction force control means, e.g. countermass]
7/70775 . . . [Position control (interferometers per se G01B 9/02; encoders per se G01D 5/00; alignment of mask with workpiece G03F 9/70)]
7/70783 . . . [Stress or warp of chucks, mask or workpiece, e.g. to compensate for imaging error]
7/70791 . . . [Large workpieces, e.g. in the shape of web or polygon]
7/708 . . . [Construction of apparatus, e.g. environment, hygiene aspects or materials]
7/70808 . . . [Construction details, e.g. housing, load-lock, seals, windows for passing light in- and out of apparatus (load-lock chambers for workpiece processors in general H01L 21/67201)]
7/70816 . . . [Bearings (fluid bearings per se F16C 32/06)]
7/70825 . . . [Mounting of individual elements, e.g. mounts, holders or supports (mounts or supports for projection- and illumination system and stages on base-plate or ground G03F 7/70833; workpiece and mask holders G03F 7/7070)]
7/70833 . . . [Mounting of optical systems, e.g. mounting of illumination system, projection system or stage systems on base-plate or ground (mounting of individual elements of said systems G03F 7/70825)]
7/70841 . . . [Constructional issues related to vacuum environment]
7/7085 . . . [Detection arrangement, e.g. detectors of apparatus alignment possibly mounted on wafers, exposure dose, photo-cleaning flux, stray light, thermal load]
7/70858 . . . [Environment aspects, e.g. pressure of beam-path gas, temperature (pollution aspects G03F 7/70916)]
7/70866 . . . [of mask or workpiece]
7/70875 . . . [Temperature]
7/70883 . . . [of optical system]
7/70891 . . . [Temperature]
7/709 . . . [Vibration, e.g. vibration detection, compensation, suppression]
7/70908 . . . [Hygiene, e.g. preventing apparatus pollution, mitigating effect of pollution, removing pollutants from apparatus; electromagnetic and electrostatic-charge pollution]
7/70916 . . . [Pollution mitigation, i.e. mitigating effect of contamination or debris, e.g. foil traps]
7/70925 . . . [Cleaning, i.e. actively freeing apparatus from pollutants]
7/70933 . . . [Purge]
7/70941 . . . [Stray fields and charges, e.g. stray light, scattered light, flare, transmission loss]
7/7095 . . . [Materials, e.g. materials for housing, stage or other support having particular properties, e.g. weight, strength, conductivity, thermal expansion coefficient]
7/70958 . . . [Optical materials and coatings, e.g. with particular transmittance, reflectance (details of optical elements G03F 7/70316)]
7/70966 . . . [Birefringence]

7/70975 . . . [Assembly, maintenance, transport and storage of apparatus]
7/70983 . . . [Optical system protection, e.g. pellicles or removable covers for protection of mask]
7/70991 . . . [Connection with other apparatus, e.g. multiple exposure stations, particular arrangement of exposure apparatus and pre-exposure and/or post-exposure apparatus, shared apparatus, e.g. having shared radiation source, shared mask or workpiece stage, shared base-plate, utilities, e.g. cable, pipe or wireless arrangements for data, power, fluids, vacuum (apparatus for processing a workpiece in a plurality of workstations including at least one lithography chamber H01L 21/67225)]

9/00 Registration or positioning of originals, masks, frames, photographic sheets or textured or patterned surfaces, e.g. automatically (G03F 7/22) takes precedence; preparation of photographic masks G03F 1/00; within photographic printing apparatus for making copies G03B 27/00)

2009/005 . . . [for microlithography]
9/70 . . . [for microlithography (measuring printed patterns for monitoring overlay G03F 7/70633 or focus G03F 7/70641; projection system adjustment G03F 7/70258; position control G03F 7/70775)]
9/7003 . . . [Alignment type or strategy, e.g. leveling, global alignment]
9/7007 . . . [Alignment other than original with workpiece]
9/7011 . . . [Pre-exposure scan; original with original holder alignment; Prealignment, i.e. workpiece with workpiece holder]
9/7015 . . . [Reference, i.e. alignment of original or workpiece with respect to a reference not on the original or workpiece]
9/7019 . . . [Calibration]
9/7023 . . . [Aligning or positioning in direction perpendicular to substrate surface]
9/7026 . . . [Focusing]
9/703 . . . [Gap setting, e.g. in proximity printer]
9/7034 . . . [Leveling]
9/7038 . . . [Alignment for proximity or contact printer (proximity or contact printers per se G03F 7/7035)]
9/7042 . . . [Alignment for lithographic apparatus using patterning methods other than those involving the exposure to radiation, e.g. by stamping or imprinting (non-exposure lithographic processes per se G03F 7/8002)]
9/7046 . . . [Strategy, e.g. mark, sensor or wavelength selection]
9/7049 . . . [Technique, e.g. interferometric]
9/7053 . . . [Non-optical, e.g. mechanical, capacitive, using an electron beam, acoustic or thermal waves]
9/7057 . . . [Gas flow, e.g. for focusing, leveling or gap setting]
9/7061 . . . [Scanning probe microscopy, e.g. AFM, scanning tunneling microscopy]
9/7065 . . . [Production of alignment light, e.g. light source, control of coherence, polarization, pulse length, wavelength]
9/7069 . . {Alignment mark illumination, e.g. darkfield, dual focus}

9/7073 . . {Alignment marks and their environment (marks specific to masks G03F 1/42; marks specific to molds or stamps G03F 7/0002; overlay marks G03F 7/70633; marks applied to semiconductor devices H01L 23/544)}

9/7076 . . . {Mark details, e.g. phase grating mark, temporary mark}

9/708 . . . {Mark formation}

9/7084 . . . {Position of mark on substrate, i.e. position in (x, y, z) of mark, e.g. buried or resist covered mark, mark on rearside, at the substrate edge, in the circuit area, latent image mark, marks in plural levels}

9/7088 . . . {Alignment mark detection, e.g. TTR, TTL, off-axis detection, array detector, video detection}

9/7092 . . . {Signal processing}

9/7096 . . . {Arrangement, mounting, housing, environment, cleaning or maintenance of apparatus}